

# Notice of Allowability

Application No.

10/021,111

Examiner

Sath V. Perungavoor

Applicant(s)

CARRIG, JAMES J.

Art Unit

2624

## -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 04/13/06.
2. ☒ The allowed claim(s) is/are 1,2,7-15,20-26,28,29,32,33 and 35-38.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All    b) ☐ Some\*    c) ☐ None    of the:
  1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  5. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

### Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date \_\_\_\_\_
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date 20060522.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_.

### EXAMINER'S AMENDMENT

[1] An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312.

To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

[2] Authorization for this examiner's amendment was given in a telephone interview with Sheryl S. Holloway (Reg. No. 37,850) on May 25, 2006.

The application has been amended as follows:

#### In claim 1

Please replace all the subject matter in claim 1 with the following:

1. (Currently amended) A method for image enhancement comprising:  
receiving an input image;  
matching regions of the input image to other available data;  
forming a combined image by snapping pixels in the input image and pixels in the matching regions to a grid corresponding to a resolution for a set of training images, the combined image containing some pixels spaced more closely than the input image; and  
generating an output image by applying a filter associated with the set of training images to the combined image, the filter comprising an optimal least squares filter distinctively determined for each pixel of the output image, wherein the output image resolution is finer than the input image resolution.

#### In claims 3, 5, 6

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Please cancel claims 3, 5 and 6.

**In claim 7**

Please make claim 7 dependent on claim 1.

**In claim 14**

Please replace all the subject matter in claim 14 with the following:

14. (Currently amended) An apparatus for image enhancement comprising:

means for receiving an input image;

means for matching regions of the input image to other available data;

means for forming a combined image by snapping the pixels in the input image and pixels in the matching regions to a grid corresponding to a resolution for a set of training images, the combined image containing some pixels spaced more closely than the input image, and

means for generating an output image by applying a filter associated with the set of training images to the combined image, the filter comprising an optimal least squares filter distinctively determined for each pixel of the output image, wherein the output image resolution is finer than the input image resolution.

**In claims 16, 18 and 19**

Please cancel claims 16, 18 and 19.

**In claim 20**

Please make claim 20 dependent on claim 14.

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**In claim 23**

Please replace all the subject matter in claim 23 with the following:

23. (Currently amended) A system comprising an electronic data processor, which, when executing a set of instructions, performs a method comprising:

retrieving a first video image at a first resolution;

forming a second video image at a second resolution by snapping pixels in the first video image and sample pixels in an additional video image to a grid corresponding to a resolution for a set of training images; and

generating a third video image by applying a filter associated with the set of training images to the second video image, the filter comprising an optimal least squares filter distinctively determined for each pixel of the third video image, wherein the third video image is at a third resolution that is finer than the first resolution.

**In claim 27**

Please cancel claim 27.

**In claim 29**

Please replace all the subject matter in claim 29 with the following:

29. (Currently amended) An apparatus comprising:

means for receiving a input image having pixels at a first resolution;

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means for receiving other available data having pixels at a second resolution;

means for forming a combined image by snapping the pixels at the first resolution and pixels at the second resolution to a grid corresponding to a resolution for a set of training images, the combined image containing some pixels spaced more closely than the input image, and;

means for generating an output image at a resolution finer than the input image resolution by applying a filter associated with the training images to the combined image pixels, the filter comprising an optimal least squares filter distinctively determined for each pixel of the output image.

**In claims 30 and 31**

Please cancel claims 30 and 31.

**In claim 35**

Please replace all the subject matter in claim 35 with the following:

35. (Currently amended) An apparatus for image enhancement comprising:

a first device having an input and an output, the input coupled to receive a first image to be enhanced;

a second device having an input and an output, the input coupled to receive a second image;

a third device having a first input, a second input, and an output, the first input coupled to receive the first device output, and the second input coupled to receive the second device output, wherein the third device snaps pixels from the first and second images to a grid having a resolution for a set of training images, and applies a filter associated with the set of training

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images to the pixels, the filter comprising an optimal least squares filter distinctively determined for each pixel of a third enhanced image, is and the grid resolution being finer than that of the first image; and

a fourth device having an input and an output, the input coupled to receive the third device output and the fourth device output coupled to send said third enhanced image, wherein the third enhanced image has a resolution that is less than or equal to the resolution of the grid.

### REASONS FOR ALLOWANCE

[3] The following is an examiner's statement of reasons for allowance: The instant invention is a high resolution image generation method.

Prior art was found for and applied in the non-final action. Applicant uniquely claimed a distinct feature in the instant invention, which are not found in the prior art, either singularly or in combination. The feature being "the filter comprising an **optimal least squares filter distinctively determined for each pixel of the output image**". That is, instead of using a single optimal least squares filter for all output pixels, the applicant uses a unique optimal least squares filter for each output pixel. This feature is not found or suggested in the prior art.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

[4] Claims 1, 2, 7-15, 20-26, 28, 29, 32, 33 and 35-38 are allowed.

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### ***Contact Information***

[5] Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mr. Sath V. Perungavoor whose telephone number is (571) 272-7455. The examiner can normally be reached on Monday to Friday from 8:30am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Bhavesh M. Mehta whose telephone number is (571) 272-7453, can be reached on Monday to Friday from 9:00am to 5:00pm. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.


Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Dated: May 25, 2006

By: 

Sath V. Perungavoor  
Telephone: (571) 272-7455

For: Bhavesh M. Mehta

  
**BHAVESH M. MEHTA**  
**SUPERVISORY PATENT EXAMINER**  
**TECHNOLOGY CENTER 2600**